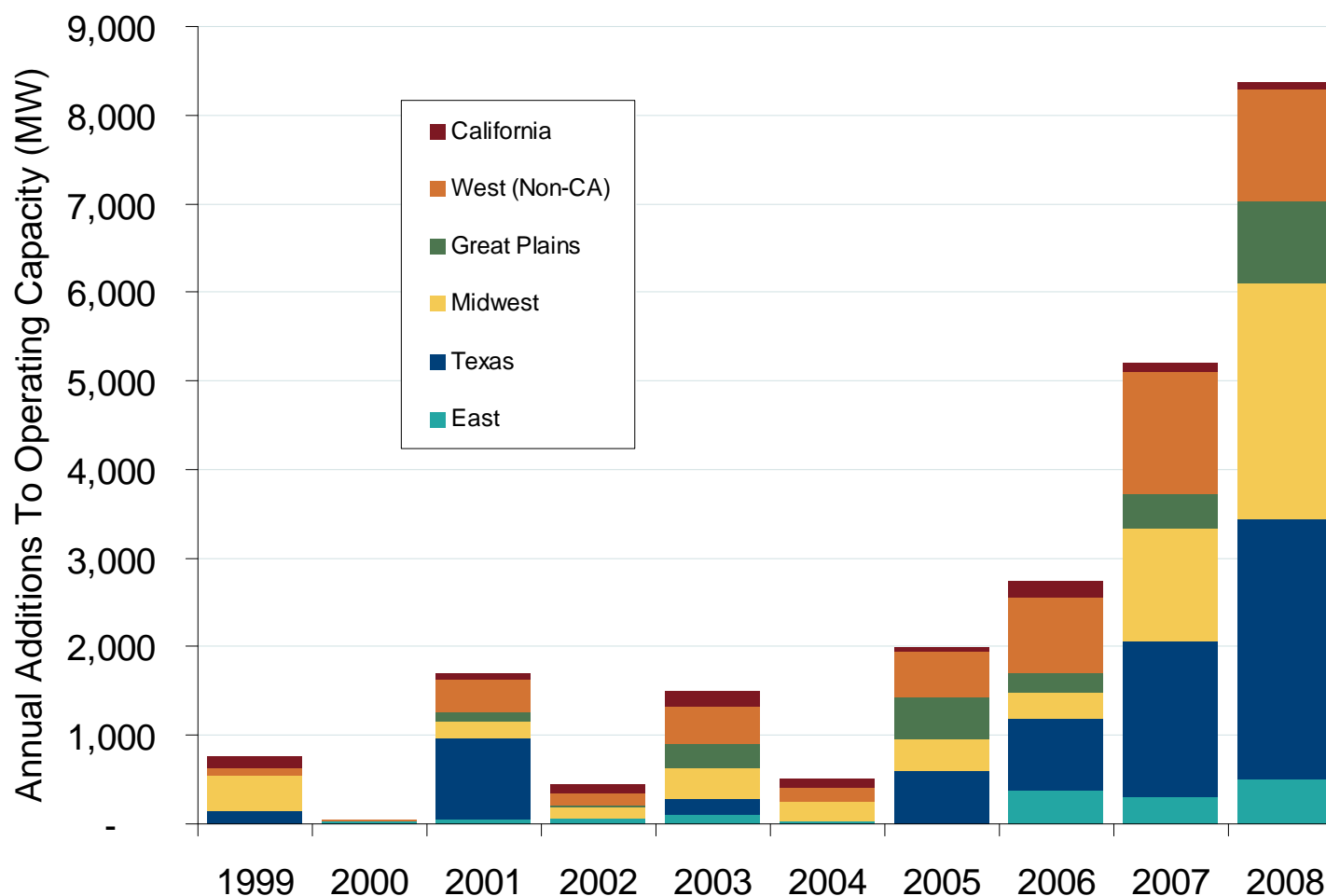


Renewable Power & Energy Efficiency: Wind Capacity Growth

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

2008 Review of Wind Capacity and Generation



West w/o CA: CO, HI, ID, MT, NM, OR, UT, WA, WY

Great Plains: KS, NE, ND, OK, SD

Midwest: IL, IN, IA, MI, MN, MO, OH, WI

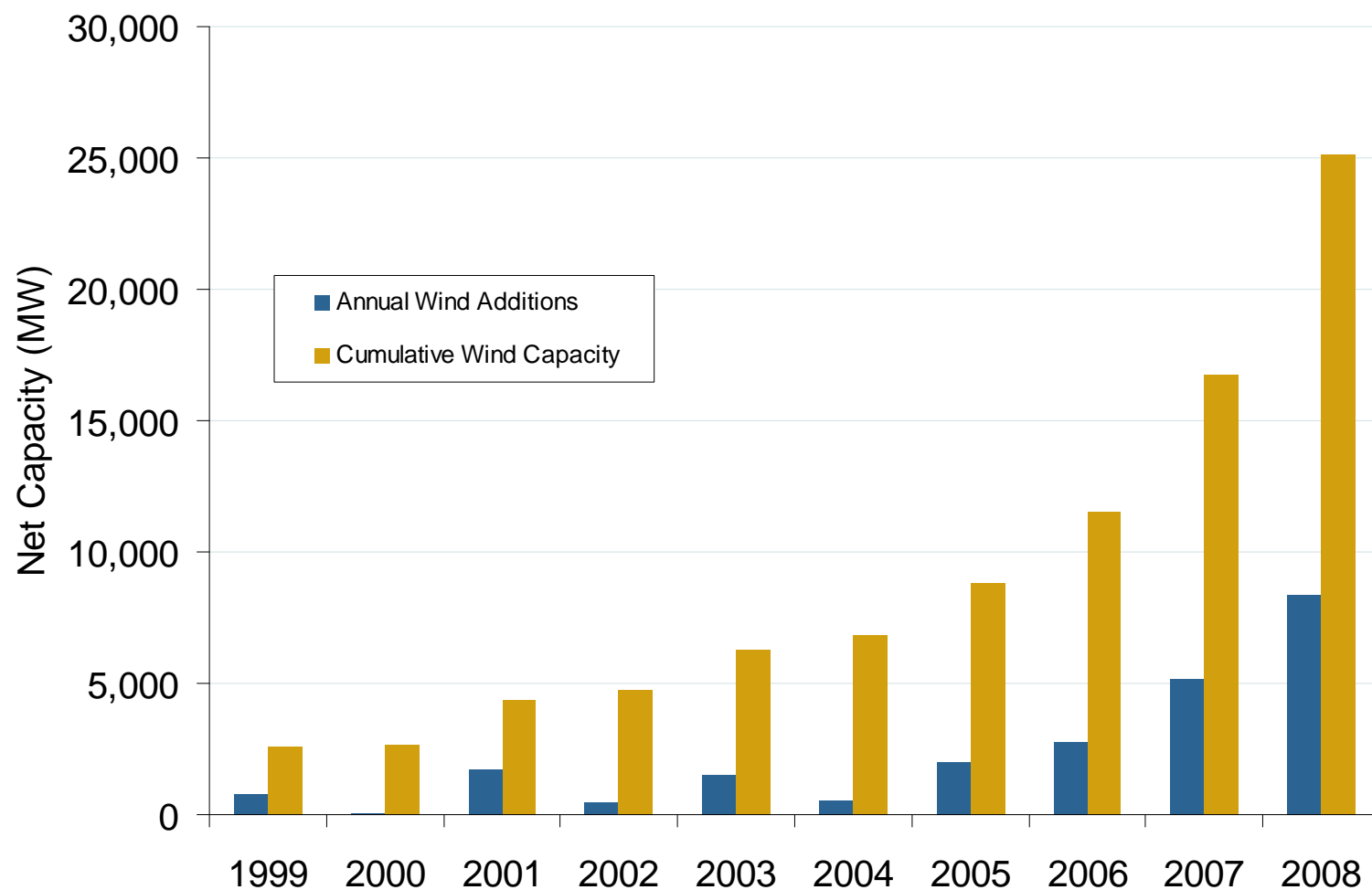
East: ME, MA, NH, NJ, NY, PA, RI, TN, VT

Source: Energy Velocity Generating Unit Capacity Dataset

Updated April 7, 2009

3022

U.S. Wind Capacity Growth, 1999 – 2008



Source: Energy Velocity Generating Unit Capacity Dataset

Updated April 7, 2009

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Renewable Power & Energy Efficiency: Annual Wind Capacity Growth

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

2008 Review of Wind Capacity and Generation

- Installed wind capacity grew 8,358 MW to 25,170 MW in 2008 from 16,818 MW in 2007, a 50% increase. Wind power was 43% of new U.S. new electric capacity in 2008, surpassing gas-fired generation.
- Installed capacity grew at a compound annual growth rate (CAGR) of 39% from 2004-08, compared to 28% for 2003-07

National wind policy and developments included:

- Congress extended the production tax credit (PTC) through Dec 2009. Indexed to inflation, it is now worth 2.1¢ per kWh for the first ten years a project operates.
- In Feb. 2009, Congress extended the credit through 2012, its longest renewal ever. This extension provides developers and equipment companies better long-term assurance to invest in projects and manufacturing facilities. The three times the PTC lapsed this decade were followed by declines in new capacity in subsequent years: 2000, 2002, and 2004 (see next chart, "Growth in Installed U.S. Capacity").
- Foreign turbine, tower, and component manufacturers have opened U.S. facilities with the PTC's steady renewal, lowering equipment transportation costs. In 2008, 30 facilities were announced, 10 opened, and 18 existing facilities expanded; 9 came online and 11 were announced in 2007.
- The economic turndown has led to some facility cutbacks, employee layoffs, project delays, and equipment order postponements.

State policies encouraged wind's growth:

- 16 of the top 25 states by cumulative MW had an RPS (14 in 2007), 3 had renewable goals (3 in 2007) while 6 had neither.
- 34% of 2008 capacity additions – 7,454 MW – were in the 20 states with the highest wind potential; 86% of total U.S. wind capacity – 21,741 MW – is in those states.

State policies (continued):

- 80% of total U.S. wind is in the top ten states. The top 5 states by installed capacity (new 2008 MW) are:
 - Texas: 7,116 MW (2,670)
 - Iowa: 2,790 MW (1,519)
 - California: 2,517 MW (78)
 - Minnesota: 1,752 MW (454)
 - Washington: 1,375 MW (212)
- Texas kept its lead as the state with the most wind capacity; Iowa passed California for 2nd place. Oregon and Colorado each have more than 1,000 MW installed.

The Commission acted to improve wind interconnection:

- Wind's rapid capacity growth created a backlog in many interconnection queues. FERC held a technical conference in December 2007 (AD08-2) to re-examine its Large Generator Interconnection Rule (Order 2003). ISOs and RTOs reported that queuing procedures specified in the Order impeded their timely interconnection of wind resources.
- In March 2008, FERC directed RTOs and ISOs to report on the status of their efforts to improve the processing of projects in their queues; it offered guidance on reforms including increased staffing, more efficient modeling, or clustering requests.** Queue reform Orders were subsequently approved for the Midwest ISO (2008), California (2008), and ISO-New England (2009).
- FERC accepted the tariff provisions NYISO proposed, which allowed it to implement a centralized program to incorporate wind output into its day-ahead and real-time energy markets. Ongoing costs are recovered from wind plant operators.***

* CAGR is a better indicator of growth rates over time than a straight percent.

** *Interconnection Queuing Practices*, 122 FERC ¶ 61,252 (2008)

*** *New York Independent System Operator*, 123 FERC ¶ 61,267 (2008)

Source: OE analysis, derived from data in Commission filings; American Wind Energy Association (AWEA); DOE, *Annual Report on U.S. Wind Power*; Energy Velocity; Lawrence Berkeley National Laboratory; and trade press.

Updated April 7, 2009

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Renewable Power & Energy Efficiency: Energy Efficiency Resource Standards (EERS) and Goals

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

21 States have Energy Efficiency Resource Standards

NE: Interim Energy Plan stresses multi-sector EE improvements

KS: Voluntary utility programs

OK: PSC approved quick-start utility EE & DR programs

MN: 1.5% annual savings based on prior-3 years average, to 2015

IA: 5.4% energy savings by 2020 - 1.5% annual

MI: 1% annual energy savings as a percent of from prior year's sales

IL: reduce energy use 2% by 2015 and peak 0.1% from prior year

OH: 22% energy savings by 2025 (from 2009); reduce peak 8% by 2018

KY: proposed RPS-EE to offset 18% of projected 2025 demand

ME: 30% energy savings; 100 MW peak electric reduction by 2020

VT: 11% energy reductions by 2011 (2% annual); administered by Efficiency VT

MA: 25% of electric load from DSR, EE by 2020: capacity and energy

NY: reduce electric use 15% by 2015 from levels projected in 2008

CT: 4% energy savings (1.5% annual) & 10% peak reduction by 2010 (from '07)

RI: reduce 10% of 2006 sales by 2022

NJ: proceeding on Energy Master Plan to reduce consumption, peak

DE: Sustainable Energy Utility charged with 30% energy reduction by 2015

PA: reduce consumption 3%, peak 4.5% by 2013 as percent of 2009-10 sales

MD: reduce per capita electricity use and peak 15% by 2015 from 2007

VA: reduce electric use 10% by 2022 (from '06)

WV: EE & DR earn one credit for each MWh conserved in the 25% by 2025 A&RES

NC: EE to meet up to 25% of RPS to 2011

TVA: reduce energy consumption 25% and cut peak 1,400 MW by 2012 (from '08) in 7-state territory ★

WA: pursue all cost-effective conservation: ~ 10% by 2025

OR: IOU 2008 goals 34 MW; administered by Energy Trust OR

CA: 8% energy savings; 4,885 MW peak reduction by 2013 (from '04)

ID: Energy Plan set conservation, DR, EE as priority resources

NV: EE up to 25% of RPS: ~ 5% electric reduction by 2015

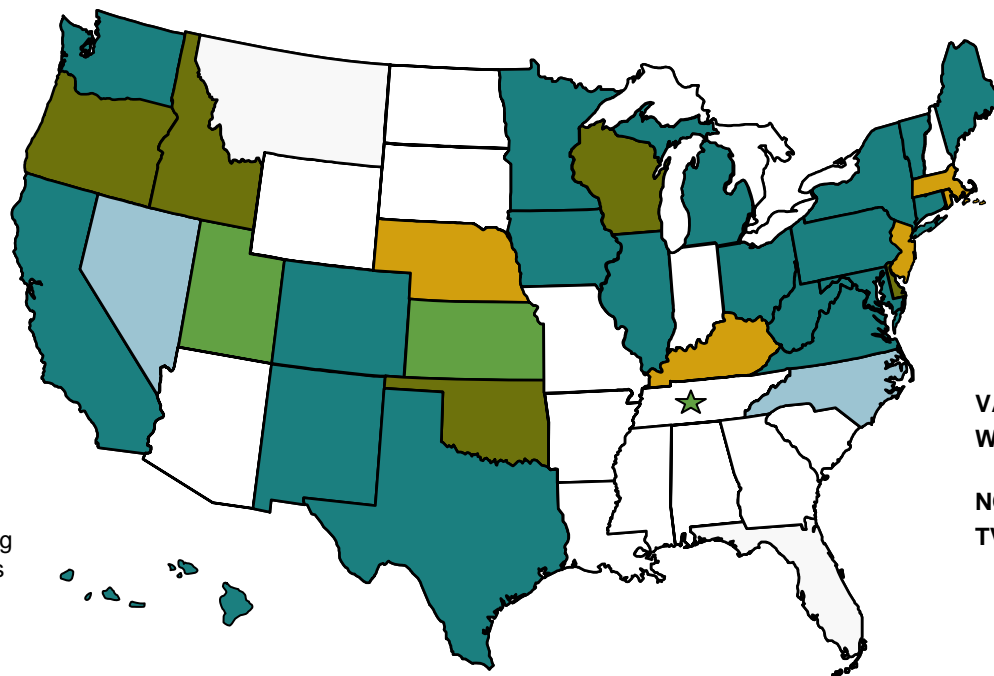
UT: EE earns incentive credits in RE goal

CO: 11.5% energy savings by 2020: ~ 3,669 GWh (from '08)

NM: 10% retail electric sales savings by 2020 (from '05)

TX: 20% of load growth by 2010, using average growth rate of prior 5 years

HI: 30% electricity reduction: ~ 4,300 GWh by 2030 (from '09)



- EE as part of an RPS law or rule
- EERS by regulation or law (stand-alone)
- Voluntary standards (in or out of RPS)
- EERS pending regulations, proposed, or studied
- Other EE entity, rule, or procurement order

Updates at: <http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-eeeps.pdf>

* TVA is a Public Power Authority – this is not a state action.

Abbreviations: A&RES – Alternative & Renewable Energy Standard; DR - demand response; DSR – demand-side resources; EE - energy efficiency; E&G: electric and gas utilities; RPS: Renewable Portfolio Standard;

Sources: ACEEE, DOE- EERE, EPA, Institute for Electricity Efficiency (IEE); Regulatory Assistance Project, State regulatory and legislative sites, State Efficiency Agency reports, trade press

Updated July 8, 2009

34001

Renewable Power & Energy Efficiency: Energy Efficiency Resource Standards (EERS) and Goals

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

Energy Efficiency Resource Standards (EERS)

- An Energy Efficiency Resource (or Portfolio) Standard (**EERS**) aims to reduce or flatten electric and gas load growth using energy efficiency (EE). It requires distribution utilities to achieve annual savings levels. An EERS may specify reductions for energy use (MWh or therms), peak demand (MW), or both.
- **Energy Efficiency** uses less fuel to produce the same or greater amount of *usable* energy from a given energy source. Reductions normally create multi-year effects over an investment's useful life. Alternatively, conservation can be temporary reductions in energy use.

STATE ENERGY EFFICIENCY ACTIVITIES:

- **21** states have an EERS, including three signed in June: Hawaii, West Virginia, and Maine. 10 others include EE in procurement orders or Integrated Resource Plan (IRP) requirements. **17** include EE as an eligible RPS resource or in an RE goal.
- **Three** states are developing regulations for an EERS: MA, NJ, and RI. **Two** states issued energy plans that stress economy-wide energy efficiency use, and propose an EERS: KY and NE.
- **Hawaii** enacted an EERS targeting a 4,300 GWh electricity reduction by 2030 – more than one-third of 2008 retail sales. EE will be an approved RPS-resource only through 2014. (June 25)
- **West Virginia's** Alternative & Renewable Energy (A&RE) Standard provides that each megawatt-hour (MWh) conserved in an approved EE or DR program earns one A&RE credit towards a utility's 25% by 2025 target. (June 17)
- **Maine's** law requires 30% energy savings and 100 MW peak electric reduction by 2020. The PUC needs to adopt regulations, including base year for reductions. (June 12)
- **Virginia** directed the SCC to conduct a proceeding to determine achievable, cost-effective conservation and DR targets; its findings are due by Nov 15. A second law authorizes the SCC to allow utilities to recover costs both of EE programs and of revenue reductions due to EE programs. (both April 8)

NATIONAL ENERGY EFFICIENCY LEGISLATION:

The House of Representatives passed the "American Clean Energy and Security Act" ("Waxman-Markey") June 26. Title I, Subtitle A, "Combined Energy Efficiency and Renewable Energy Standard," proposes national minimum electric savings, measured by average annual sales during the preceding two calendar years.

- **Utility coverage:** Large utilities are included, defined by retail sales volume; they serve 95% of electric customers.
- **Cumulative Savings:** Electric savings ramp from 1.5% in 2012 to 5% in 2020. States with difficulty meeting the full RPS target may petition FERC to increase EE to 8%.
- **EE as a Resource:** States would be required to consider EE as a resource in utility planning and procurement.
- **Costs:** States should procure all EE available at lower costs than energy supply options. ACEEE testimony on companion bill S 548 cited average EE program costs of 3¢/kWh, relative to new power plant costs of up to 13¢/kWh.

STATE DECOUPLING ACTIVITY:

- **Decoupling** is *one* mechanism to incent EE programs. It severs utility profits from the quantity of therms or kilowatt-hours sold. Some State Utility Commissioners express concerns about potential "one-size-fits-all" national decoupling provisions. **Gas decoupling** mechanisms exist in 16 states; they are pending in 6 others.
- **State electric decoupling** actions include:
 - **Four** adopted decoupling: CA, CT, MD, and WI.
 - **Nine** will consider or have approved decoupling in individual rate cases: KS, MA, MI, MT, NY, OH, OK, OR, and WA.
 - **Six** opened proceedings or dockets to explore decoupling or to approve utility proposals: DC, DE, HI, NH, NJ, and WI.
 - **Two** have laws or orders to study decoupling: FL and NM.
 - **One** has a residential decoupling pilot: ID.

Abbreviations: ACEEE - American Council for an Energy Efficient Economy; A&RES – Alternative & Renewable Energy Standard; EE - energy efficiency; EERS – Energy Efficiency Resource Standard; IRP – Integrated Resource Plan; PSC / PUC – Public Service / Utility Commission; RPS – Renewable Portfolio Standard; SCC – State Corporation Commission

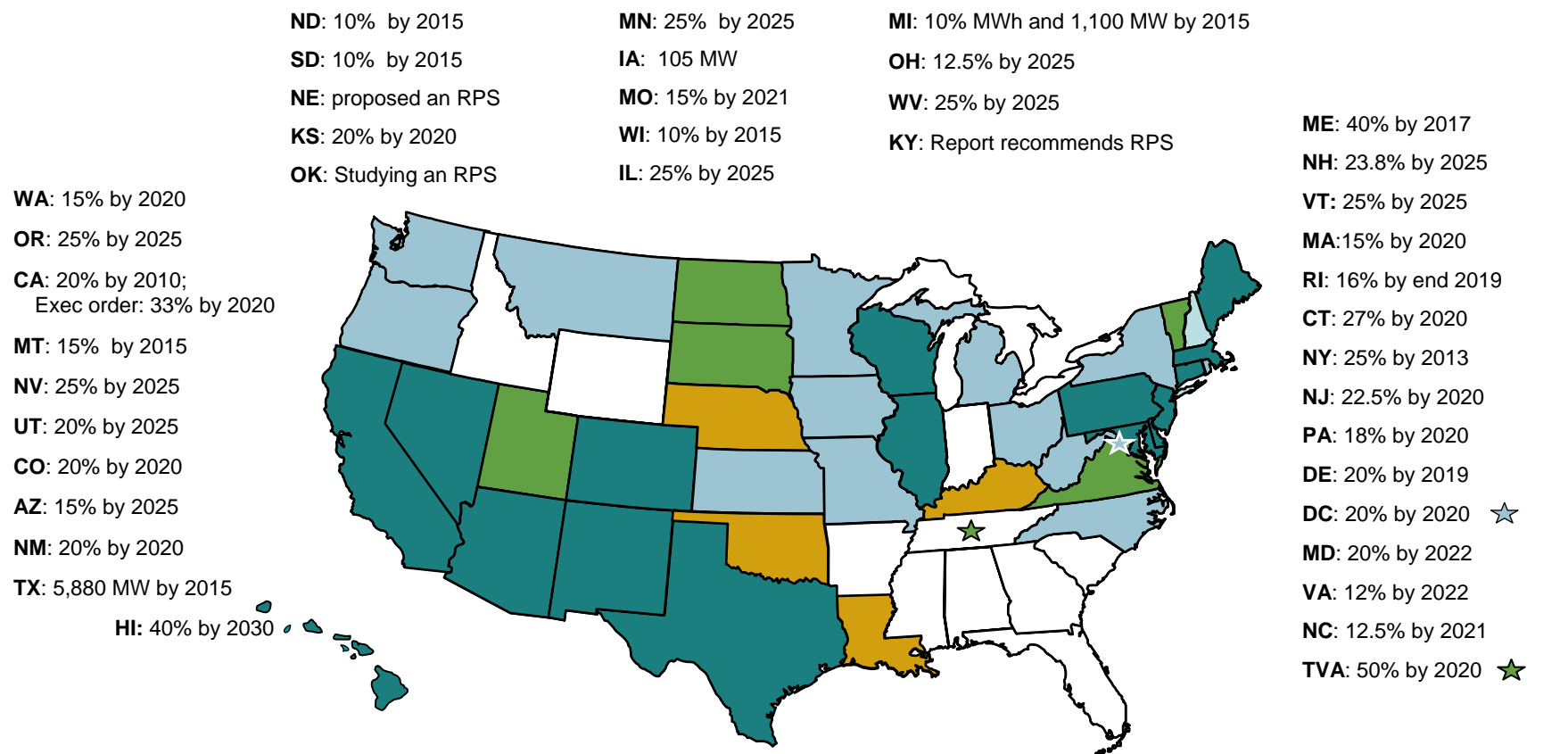
Updated July 8, 2009

34001

Renewable Power & Energy Efficiency Market: Renewable Portfolio Standards

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

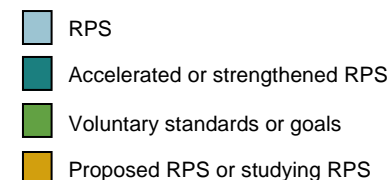
31 States including D.C. have Renewable Energy Portfolio Standards (RPS)



Updates at: <http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-rps.pdf>

Notes: An RPS requires a percent of an electric provider's energy sales (MWh) or installed capacity (MW) to come from renewable resources. Most specify sales (MWh). Map percents are final years' targets. *TVA's goal is not state policy; it calls for 50% zero- or low-carbon generation by 2020. Alaska has no RPS.

Sources: Derived from data in: LBNL, *RPS in the U.S. through 2007* (4/08), PUCs, State legislative tracking services, Pew Center, and the Union of Concerned Scientists. Details, including timelines, are in the Database of State Incentives for Renewables and Energy Efficiency: <http://www.dsireusa.org>



Updated July 8, 2009

34002

Renewable Energy Portfolio Standards

A Renewable Portfolio Standard (RPS) or Renewable Energy Standard (RES) requires a percent of energy sales (MWh) or installed capacity (MW) to come from renewable resources. Percents usually increase incrementally from a base year to an ultimate target. The percents shown on the map are ultimate targets.

- **31** states – including D.C. – have renewable mandates.
- **Six** have renewable goals without financial penalties.

State Renewable Actions:

- **West Virginia** became the **31st** state with an RES when Gov Manchin signed the Alternative and Renewable and Energy (A&RE) Portfolio Standard (June 17). It calls for 25% of electricity sales to come from A&RE resources by 2025, including advanced coal technologies. WV is the 5th state to authorize alternative energy resources to meet part of an RPS. Others are IL, PA, OH, and MI.
- **Hawaii's** Gov Lingle signed a combined Renewable Energy and Energy Efficiency Act (HB 1464) (June 25). It increases the existing RPS to 40% in 2030 from 20% in 2020, and creates a separate Energy Efficiency Resource Standard (EERS). EE remains an RPS-eligible resource through 2014. This law codifies policies in the October 2008 "Hawaii Clean Energy Initiative."

National Renewable Actions:

- The House passed the "American Clean Energy and Security Act" ("Waxman-Markey") on June 26. Title I, Subtitle A, "Combined Energy Efficiency and Renewable Energy Standard," includes a national RES. It begins at 4.5% of retail sales in 2012 and increases to 15% in 2020. Efficiency reductions are the second part of the combined standard; they begin at 1.5% and rise to 5%. A Governor who determines that local utilities cannot meet the renewables requirement may petition FERC to reduce that target to 12%. If granted, the EE requirement would increase to 8%.

Renewable Energy Zone Plans Advance:

- The **Western Governors Association** and DOE released a report on June 15, "Western Renewable Energy Zones." This Phase I report begins to identify Western Interconnection areas with the best potential for large-scale renewable development yet low environmental impacts. The Western Renewable Energy Zones (WREZ) initiative was launched in May 2008, with representatives from 11 states, two Canadian provinces, and areas in northern Mexico.
- The **California Energy Commission** issued a draft report June 1 for its Renewable Energy Transmission Initiative (RETI). RETI was established in 2008 to plan transmission needed to meet the state's 33% by 2020 renewable goals. Phase 1 identified and ranked Competitive Renewable Energy Zones (CREZ). Phase 2 developed conceptual plans to access the best of those zones. The report identified two sets of major lines by re-ranking the 35 zones identified in Phase 1, and by focusing on the most feasible areas for biomass, geothermal, solar, and wind projects.
- Eight **Northeast and Mid-Atlantic** Governors sent a joint letter to Congressional leaders urging them to recognize the potential both of onshore and of off-shore wind resources (May 4). The Governors urged them to consider regional differences in devising renewable energy transmission corridors. They proposed the creation of an offshore wind transmission regime, with new FERC policies tailored to offshore's special circumstances. "Meeting New England's Renewable Energy Targets," a white paper on transmission requirements, accompanied the letter.
- The **Texas** Public Utility Commission issued an order selecting entities to build transmission projects to renewable-rich areas under its CREZ process (March 31). Developers were awarded nearly \$5 billion to build 14 projects. In 2005, SB 20 set up the CREZ process so the vast renewable energy potential in remote Texas zones could be delivered to population centers. The PUCT opened two dockets to sequence priority and secondary projects and to consider applications for transmission line certificates of convenience and necessity.

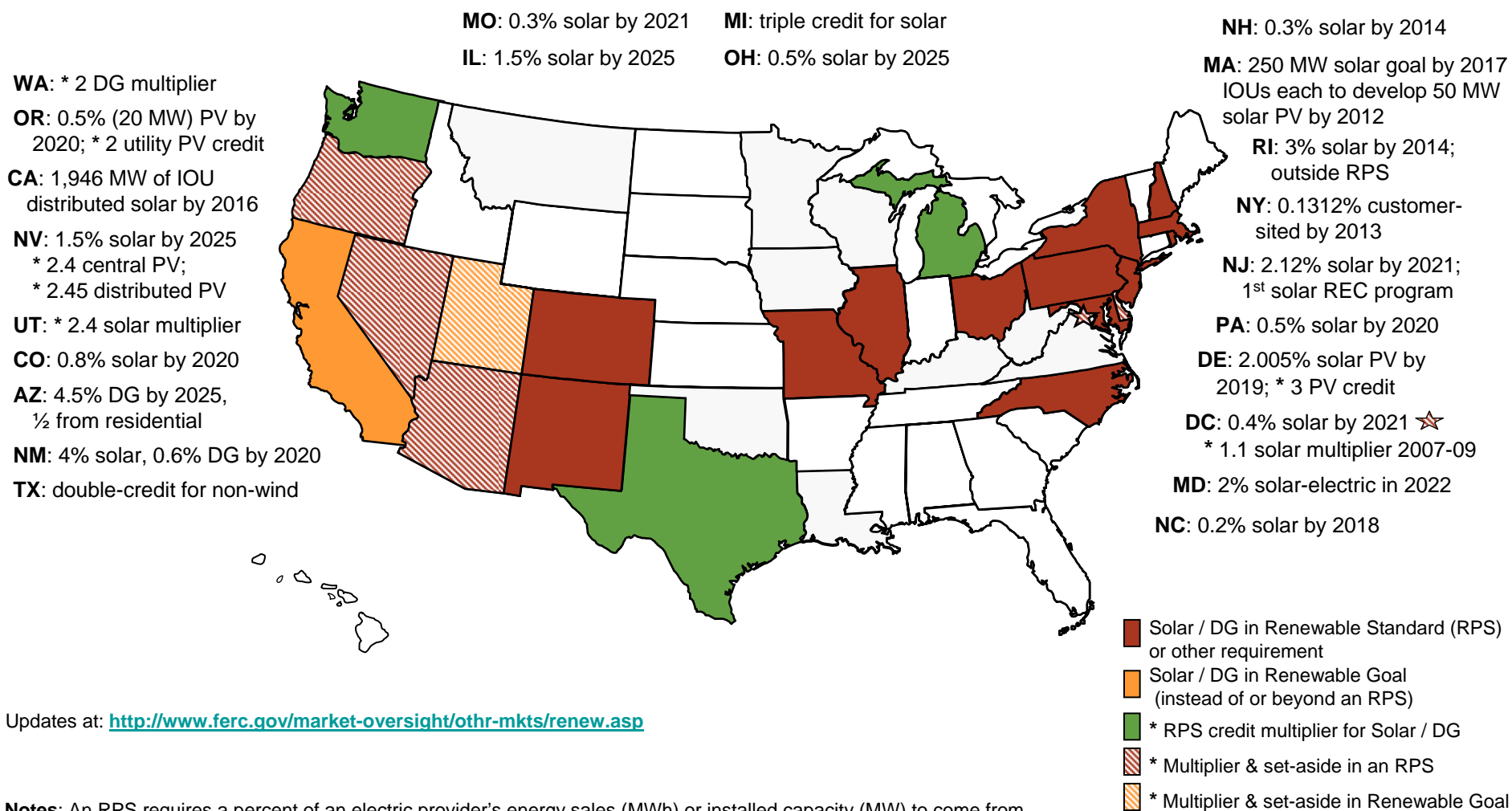
Abbreviations: A&RE – Alternative and Renewable Energy; CREZ – Competitive Renewable Energy Zone; DOE – Department of Energy; EE - Energy Efficiency; EERS – Energy Efficiency Resource Standard; PUCT – Texas Public Utility Commission; RES – Renewable Energy Standard

Updated July 8, 2009

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Renewable Power & Energy Efficiency Market: Solar and Distributed Generation RPS

Federal Energy Regulatory Commission • Market Oversight @ FERC.gov

16 States and D.C. have Solar or Distributed Generation RPS ProvisionsUpdates at: <http://www.ferc.gov/market-oversight/othr-mkts/renew.asp>

Notes: An RPS requires a percent of an electric provider's energy sales (MWh) or installed capacity (MW) to come from renewable resources. (*) Multipliers receive extra credit towards RPS compliance.

Abbreviations: DG – Distributed Generation; PV – solar photo-voltaic; RPS – Renewable Portfolio Standard

Sources: Derived from data in: LBNL, *RPS in the U.S. through 2007* (4/08), PUCs, and the Database of State Incentives for Renewables and Energy Efficiency: <http://www.dsireusa.org>

Updated September 3, 2009

34003